A Theoretical Basis for Prolotherapy

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Definition : The term prolotherapy derived from the Latin Word : proles meaning "growing" or "offspring". It refers to a treatment that involves the injection of chemicals designed to strengthen weakened ligaments, tendons, and joints to encourage repair of damaged tissue.

Mechanism of Action: During prolotherapy, some substances (proliferants) are injected directly into ligaments,tendons or intra - articular. Over a few weeks time, pain decreased and function of a painful skeletal articulation returned to normal levels. Immediately following the injection, usually we observe localized inflammation and discomfort. What is the underlying mechanism? In order to understanding this mechanism, we should know about the healing Process or healing cascade.

Wound healing process:

1) During the healing of an injury, cellular debris and humoral factors (such as clotted blood, cytokines, chemical messengers and etc.) attract to initial influx of granulocytes.

2) Granulocytes secrets some factors (such as photolytic enzymes) which attract other cells, predominantly coenocytes and macrophages.

In fact the initial phase of inflammation started with granulocytosis (for about three days), and a second overlapping, late inflammatory phase is initiated with monocytes and macrophages migration which lasts for a longer period (about ten days).

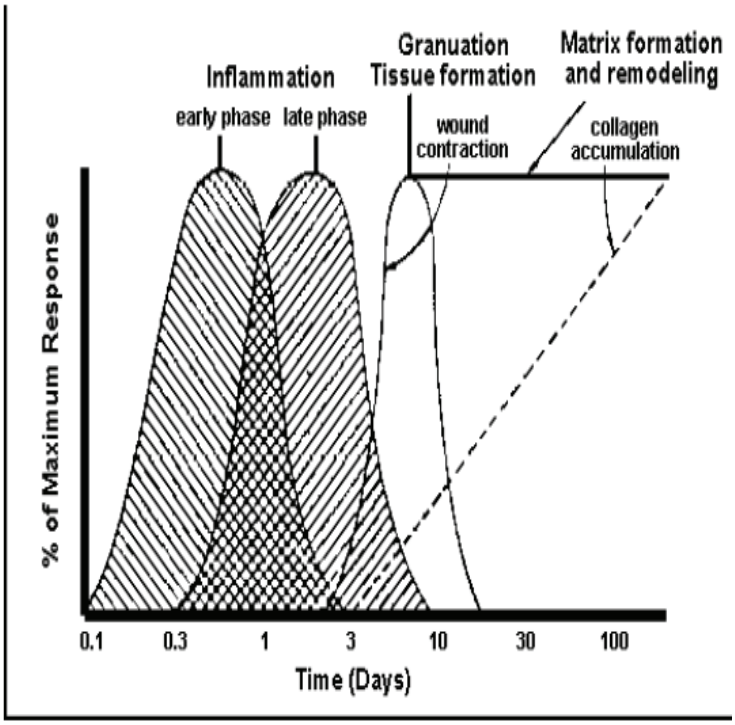
3) Some factors such as growth factors are secreted by both stages of inflammatory cells, which stimulate fibroblast attraction at the injury site.

The fibroblasts produce new intracellular matrix, including new collagen.

4) All of these processes form granulation tissue that is necessary for wound healing.

5) In the next days or weeks, granulocytes die and are removed by the macrophages, and fibroblasts remain to build a strong matrix of collagen at the injured site.

So we have three stages: Inflammation, Granulation tissue formation, Matrix formation and remodeling. All of these processes is called the wound healing cascade.



Most proliferants are substances which lead to new collagen formation by initiating the first step in the wound healing cascade. Irritant agents (such as phenol) alkylate the proteins on the surfaces of cells, and by this damage, granulocytes are attracted and wound healing cascade is initiated. Other agents such as chemotoctics, growth factors, osmotic agents, can stimulate this cascade and initiated collagen synthesis and connective tissue strengthening.

Dextrose is the oldest and the most important agent in prolotherapy. Hyperosmolar dextrose (10 – 25%) when injected, causes a net flow of water within cells across their cell membranes into the immediate vicinity of the injection site. When cells are damaged or died, fragments of cellular proteins attract granulocytes. Traumatized cells release prostaglandins,leukotrienes,thromboxanes,which all of these subestances, are inflammatory mediators, and can initiate collagen formation and fibroplasia and wound healing cascade.

For this reasons, patients should not receive any NSAIDS before and after proliferants injections.